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## *P41. Microstructure and thermoelectric properties of misfit-layered cobalt oxides with metallic nanoinclusions prepared by a printing technique*

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In order to broaden the use of thermoelectric (TE) materials for practical application as an electric power generator from waste heat, simple, cheap and reliable methods for producing materials and thereof TE elements must be considered and demonstrated. We have employed a printing technique, which is cheap and easy to carry out, to prepare p-type TE-tapes (TE materials on a ceramic substrate) using nano-scale misfit-layered cobalt Ca3Co4O9+ oxide materials with metallic nanoinclusions. The TE-tapes were sintered in air at various temperatures and holding time. After each sintering process, microstructure observation by a scanning electron microscopy (SEM) and crystal structure through the X-ray diffraction analysis were carried out in order to find an optimal sintering condition. The thermoelectric properties were characterized from room temperature up to about 1000 K. We found that the maximum power factor was improved about 67% (3.10x10-4 Wm-1K-2) for the tape with a proper of silver (Ag) metal nanoinclusions as compared to (1.86x10-4 Wm-1K-2) for the counterpart without metallic nanoinclusions under the same sintering condition at 950 oC. The thermoelectric properties and thermal stability of TE-tape is further improved by a subsequent hot-pressed sintering process.